Soil Fertility

Lake-friendly Gardening

The Vermont and New York Master Gardener Programs, supported by the University of Vermont and Cornell Extension and Lake Champlain Sea Grant, support the objectives of the Lake Champlain Management Plan and Basin Program. This factsheet is intended to help prevent or reduce pollution coming from residences within the Lake Champlain Basin.

Protect the soil

Soil is the essential foundation for all higher plants. Its fertility, pH (measure of acidity), moisture content, and physical qualities determine how well it will support plant life. Understanding and caring for the soil will produce a healthier, more productive garden.

The **lake-friendly gardening** approach to soil fertility is to have your soil tested and apply fertilizers and limestone in the recommended amounts. By minimizing excess applications, your soil will sustain healthier plants, and any impact on water quality will be minimized.

Know your soil

Drainage

Drainage is the ability of water to flow through the soil. Water and dissolved chemicals move quickly through coarse-textured, sandy, or gravelly soil. Fine-textured silt and clay soils and soils high in organic matter slow down the flow of water. These soil types provide sites for plant nutrients and other chemicals to adhere to.

Well-drained soils that are at least 2 feet deep are the most suitable for all types of gardening. Soils with a high water table or those with a shallow hardpan layer will have more problems and may require site management and/or modification.

Fertility

Minerals necessary to support plant life are supplied from organic and inorganic sources. The complex chemical processes that supply plant nutrients are affected by the soil environment, moisture, temperature, pH, and types of microorganisms present.

Improper application of fertilizer, including organic fertilizers, can result in loss of nutrients by surface runoff to nearby streams,

lakes, and rivers, or by percolation into the groundwater.

Applying too much fertilizer can:

- pollute surface and groundwater
- damage plant roots
- increase susceptibility to diseases
- encourage weed growth
- stimulate unwanted growth
- waste money and time

To avoid over-fertilization, have the soil tested. Contact the Master Gardener Program (see contact information at end). Testing will give the level of primary plant nutrients and pH, recommended fertilizer rates to correct any deficiencies, and warn of excessive nutrient levels. It is important not to exceed the suggested rates.

Complete chemical fertilizers—containing nitrogen, phosphorus, and potassium or organic sources of plant nutrients (cottonseed and bone meal, manures, compost, etc.)—are available and may be used to supply needed nutrients. Because the percentage of plant nutrients in most organic material is relatively low compared to chemical fertilizers, large amounts may be required to supply the needs of plants.

Properly timed annual or semi-annual applications of fertilizer are more beneficial to the plant's health and are less likely to cause environmental damage than infrequent, heavy, ill-timed applications. Always fertilize based on the results of a soil test. Nutrients that run off in the surface water will eventually reach Lake Champlain. High nutrient levels may cause unnatural and sometimes disastrous algae blooms and other water quality problems. Plant nutrients or garden chemicals leaching into the groundwater can contaminate drinking water for this and future generations.

Woody plants, as a general rule, produce an abundance of roots in the spring as the soil warms. Depending on how stressful summer weather conditions are, additional root growth will occur in the fall as the soil cools. Controlled-release fertilizers can be applied in the spring or late fall if the soil has sufficient moisture. A fertilizer containing nitrogen in a slow-release form is usually recommended for fall fertilization. Avoid fertilizer application to dry soil and when soil temperatures are below 40°F.

Trees and shrubs growing in or bordering a regularly fertilized lawn will usually not need separate applications of fertilizer. Plants not displaying adequate growth or having poor foliage color may be suffering from a disorder other than lack of nutrients. Always locate and remedy the primary cause before applying fertilizer to possibly aid in the plant's "road to recovery." Recently installed woody plants may respond to a fertilizer application if nutrient levels are low.

Avoid fertilizing woody plants from mid-June through September to avoid late flushes of tender growth that will not harden off properly before winter sets in. This tender growth could be injured or killed at low temperatures, providing entry for disease during the next growing season.

Conditioning

Productivity and workability of the soil can be greatly improved by mixing in suitable decomposed organic matter, such as compost. This will improve the water and the nutrient-holding ability of the soil, buffer temperature changes, and prevent rapid fluctuations in the pH. With increased microbial activity, the breakdown of many pesticides will be aided. Organic matter also slows or reduces the leaching of many pesticides into the groundwater.

Remember:

- Fertilize according to what the plant needs.
- Do not over-fertilize.
- Time applications correctly.
- Add organic matter to improve soil structure.

Master Gardener Program
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Cornell Cooperative Extension: Clinton County: (518) 561-7450; Essex County: (518) 962-4810

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